

Research assessment, ranking and strategic bibliometric analysis – a case of Ural Federal University

Ed Noyons, CWTS, Leiden University

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Universiteit
Leiden

Outline

- Introduction
 - CWTS
 - Web of Science data
 - Data, Methods & Tools
- Case of the UrFU
 - Leiden Ranking
 - Strength Potential & Risk (SPR) analysis

Introduction CWTS

- Research Institute (CWTS)
 - 30 years
 - Initially focusing on bibliometrics
 - Since 2008 substantial funding
 - Since 2010 broadening of agenda
 - Recently evaluated
 - No educational task yet
- Company (CWTS BV)
 - Services derived from research
 - Input for research
 - Studies performed by researchers at institute

Research

- Advanced quantitative methods
- Qualitative studies of research evaluation process
- Science – society interaction
- Science, Technology and Innovation
- Career studies
- Science policy

Services

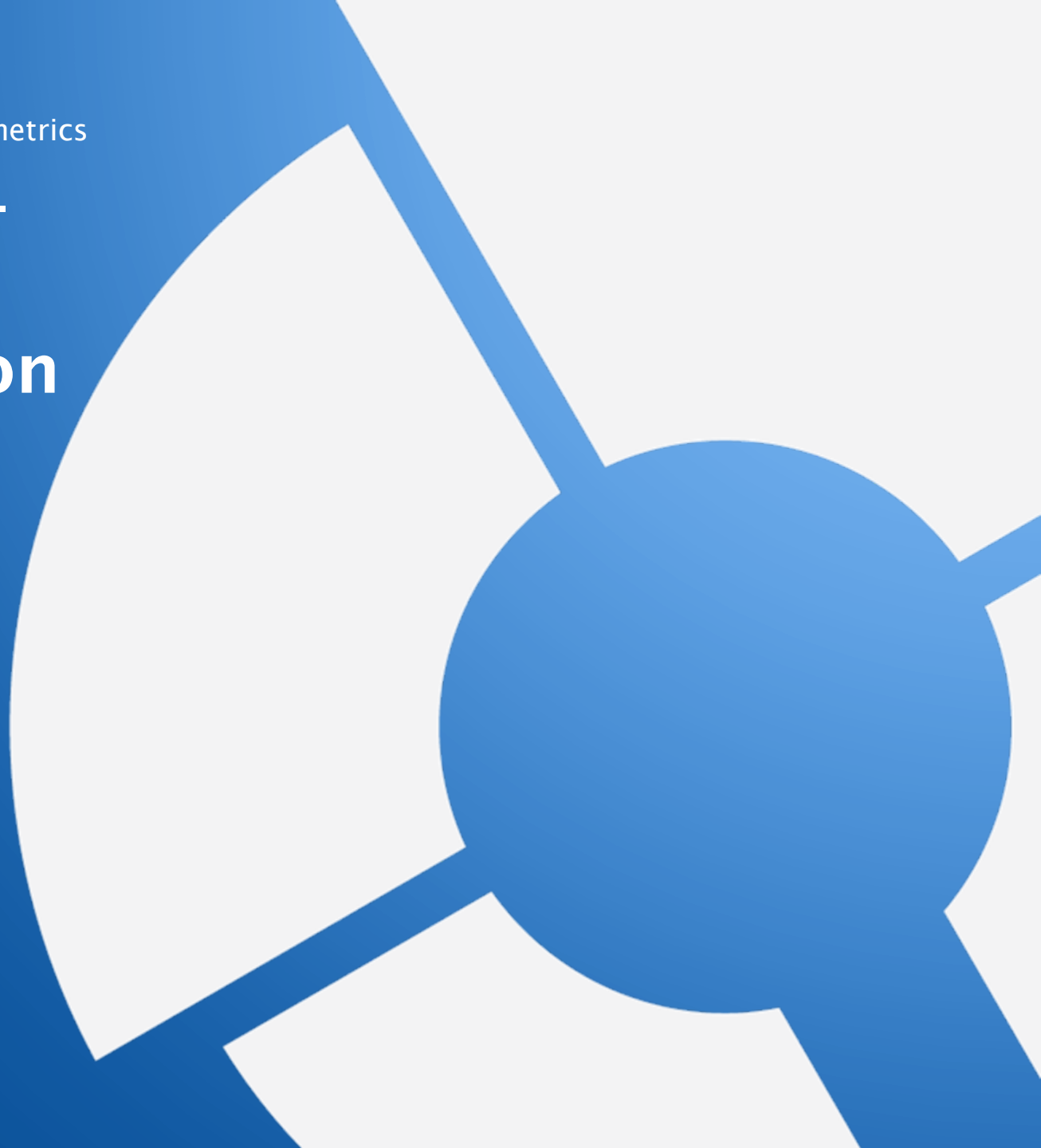
- Primarily quantitative studies in the context of research evaluation
- For universities, research institutes, funding agencies, ministries ...
- Not just figures and standard reports
- Training and education

Web of Science (WoS) at CWTS

- Web of Science (WoS)
 - Local version
 - Cleaned author affiliations (Leiden Ranking Register)
 - Cleaned Funding organizations (acknowledgements)
 - Improved matching of reference-matching
 - In-house publication-level classification scheme
 - In-house author identification
- Patent database (esp. NPL refs linked to WoS)

Example a advanced bibliometrics

Publication- level classification



Structure of all sciences

- Clusters of publications
- To represent fields of science
- Candidates to establish this:
 - Journal level (e.g., WoS journal categories, OECD/ subject classification)
 - Publication level (e.g., based on MESH)

Categorization based on *journals*

- Advantages:
 - Easy to understand
 - Stable structure
- Problems:
 - ‘Objectivity’
 - Traditional fields
 - Multi-disciplinary/ general journals
 - Fields representing a variety of sub-fields

Publication-based classification

Waltman & Van Eck (2012)

- Citing relations among publications (WoS 2000-2015)
- Self-organized: clusters at four different levels (current version)
 - Top level 5 main fields
 - Second level of ~30 fields
 - Third level of ~800 fields
 - Fourth level of ~4,000 areas
- Disjoint clusters;
- Hierarchical.

CWTS Publication-level classification

- Advantages
 - ‘Objective’
 - Independent from journals
 - Dynamic
 - Sophisticated structure for normalization and benchmarking
- Challenges
 - Labeling
 - updates

Map all sciences

- Map of almost 4000 research fields/topics based on entire WoS (global map of science);
- Self-organized clusters of publications based on citing relations;
- Coherent clusters but not necessarily easy to label;
- Automated labels (keywords, journals);
- Updated on a yearly basis.

Basic structure

Map of all sciences (~4000 clusters)

- Cluster of publications
- Size represents volume

Social Sci & Hum.

Maths & CompSci

Life & Earth

- Distance represents relatedness
- Citation traffic

Biomedical & Health

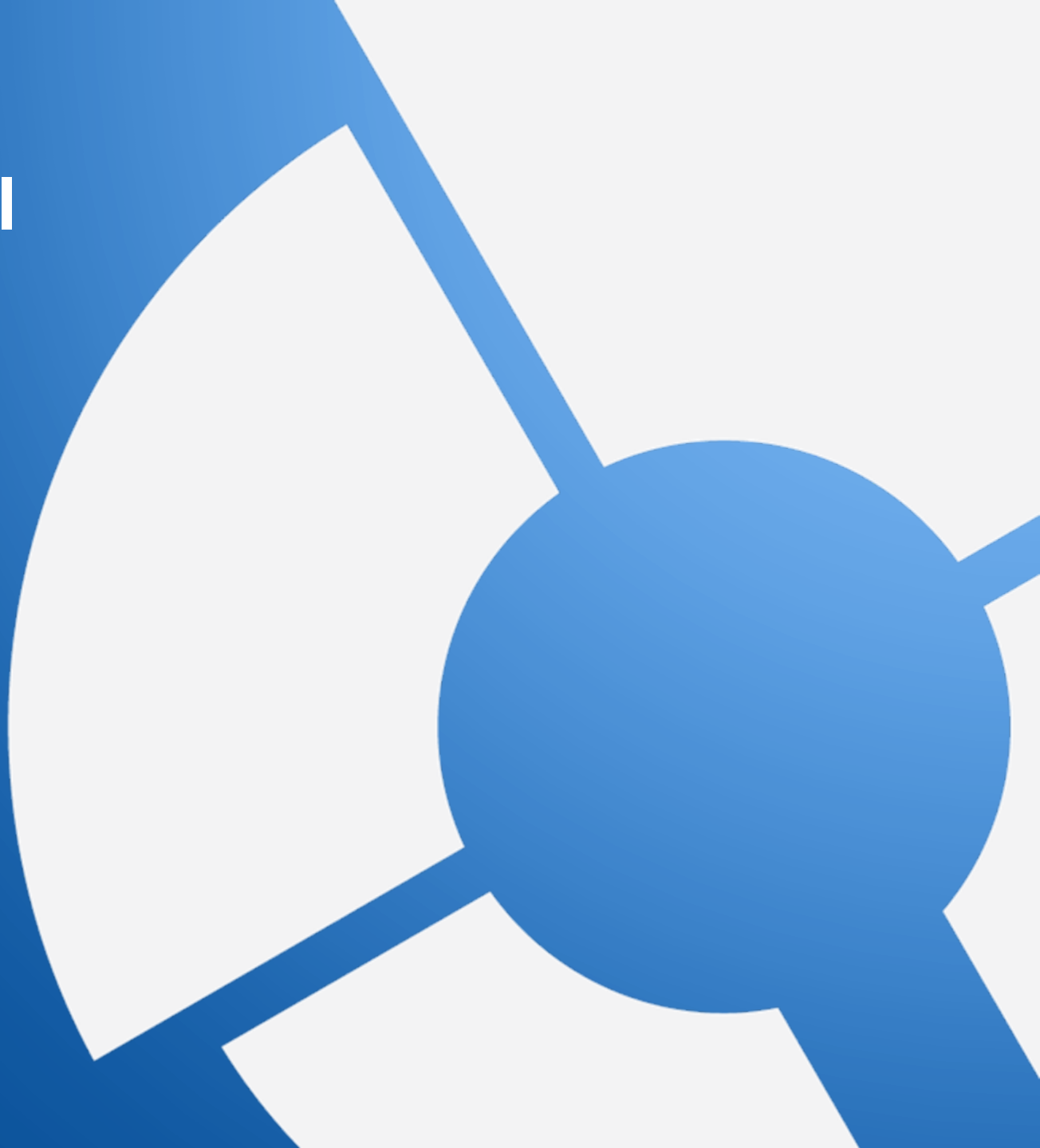
Physical Sci & Engin.

Methods and tools

- Methods
 - Better indicators
 - Better structures of science/ proper field definition
 - Contextualize bibliometric performance
- Tools
 - Leiden Ranking
 - Journal indicators
 - VOSviewer
 - CitNetExplorer

A case study

Ural Federal University



UrFU ambition

Source: website UrFU

- Our aspiration is to *become* a world-class university in the heart of Eurasia committed to the complex and sustainable development of research and teaching.

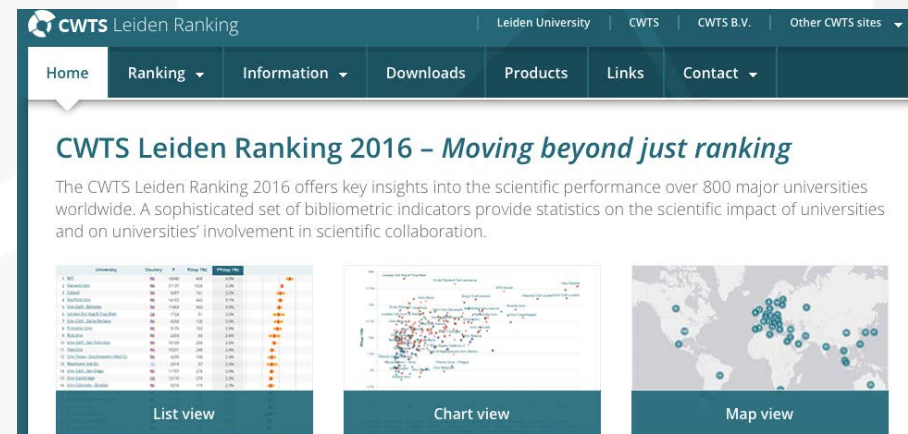
UrFU in Rankings

Source: UrFU website

- placed 6th among Russian universities (Webometrics Ranking of World Universities)
- top-10 best Russian universities (“Expert RA” rating agency);
- top-60 of the best universities of the Emerging Europe and Central Asia (QS Quacquarelli Symonds);
- top-650 (QS World University Rankings);
- placed 13th in the ranking of national universities by the Interfax Rating Agency;
- placed 77th among BRICS countries universities (QS World University Rankings: BRICS);
- placed 3rd as per the number of patents among the companies in Russia (The Research & innovation performance of the G20 (Russia) — Thomson Reuters).

Leiden Ranking

- Currently a university ranking
- Focusing on Research
- Criteria to enter:
 - Universities only
 - At least 1000 publications (fractionalized) in studied period (recent 4 year)
- Data collected for 2000 organizations to make selection



UrFU *if* in the Leiden Ranking

- We found 124 name variant of UrFU
- UrFU is beyond half way to meet the LR criteria to enter
- We calculated the following scores:

Indicator	UrFU 2016	UrFU 2017*
P (2011-2014)	1,657	2,134
P fractionalized	450	586
MNCS	0.59	
Ptop 10%	18	
PPtop10%	0.04	
PP Collab	0.54	0.56
PP Intl collab	0.28	0.29
* <i>Estimated scores</i>		



Chart view LR scores 2016

- P * PPtop10

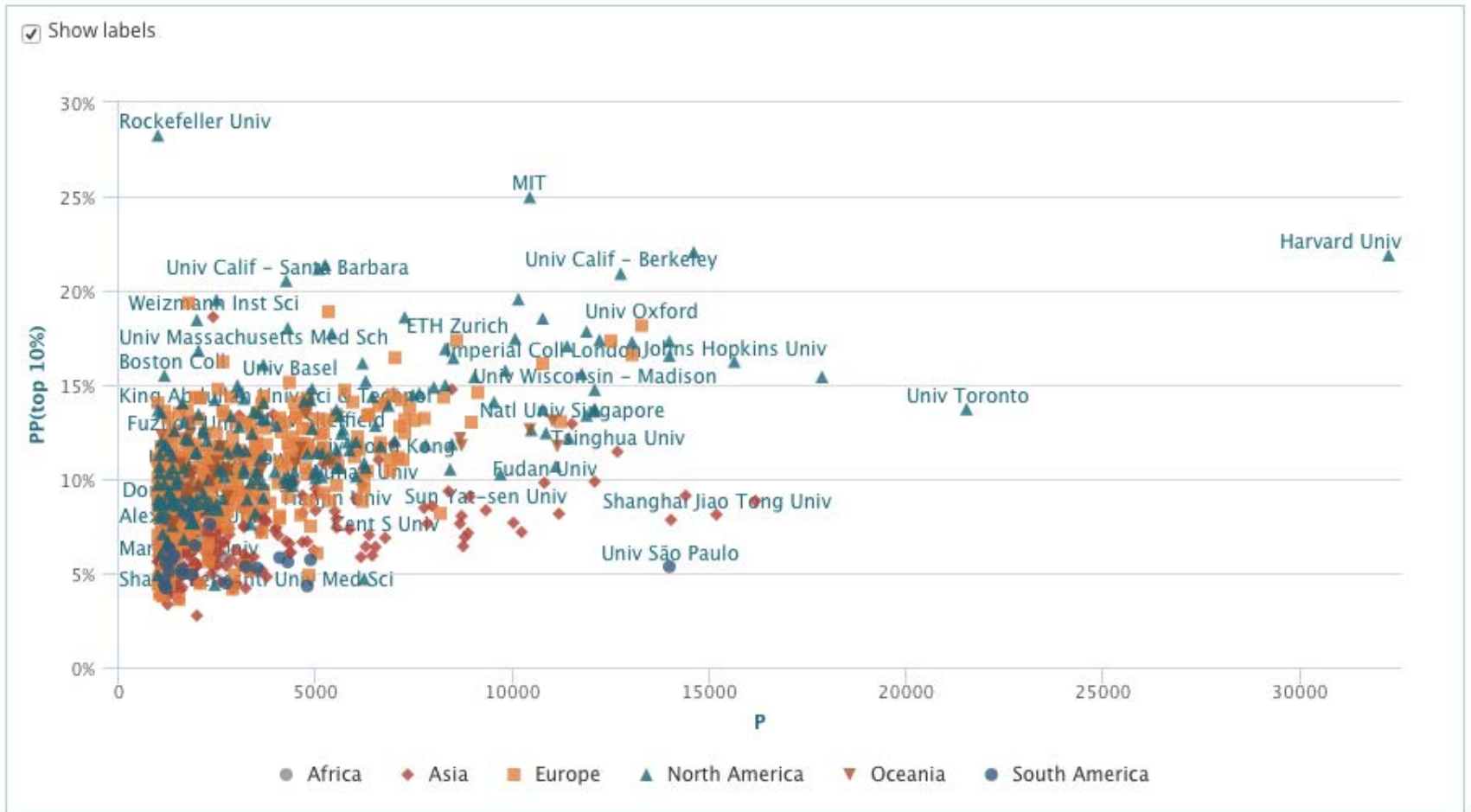
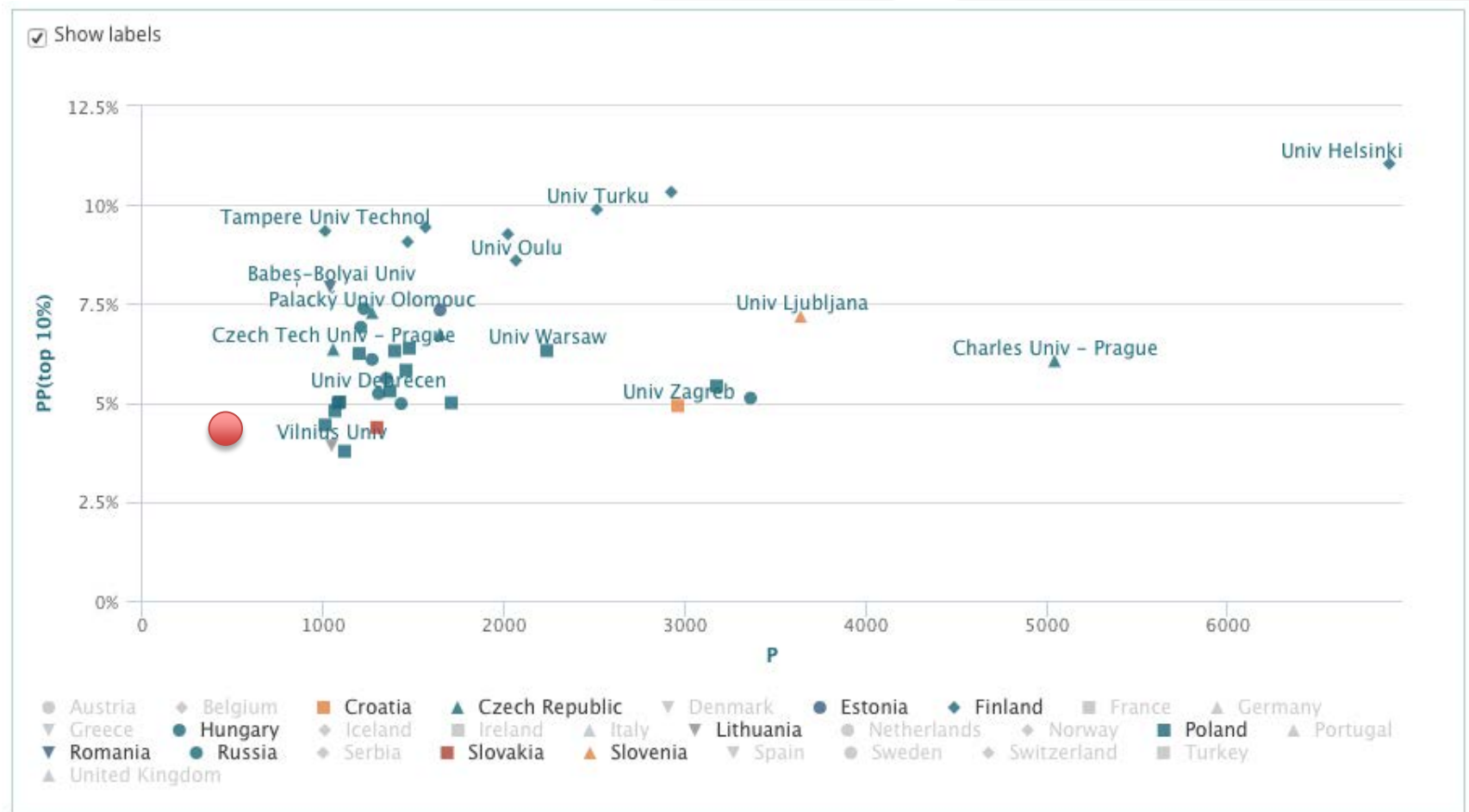


Chart view LR results 2016 (cut out) and (virtual) position UrFU



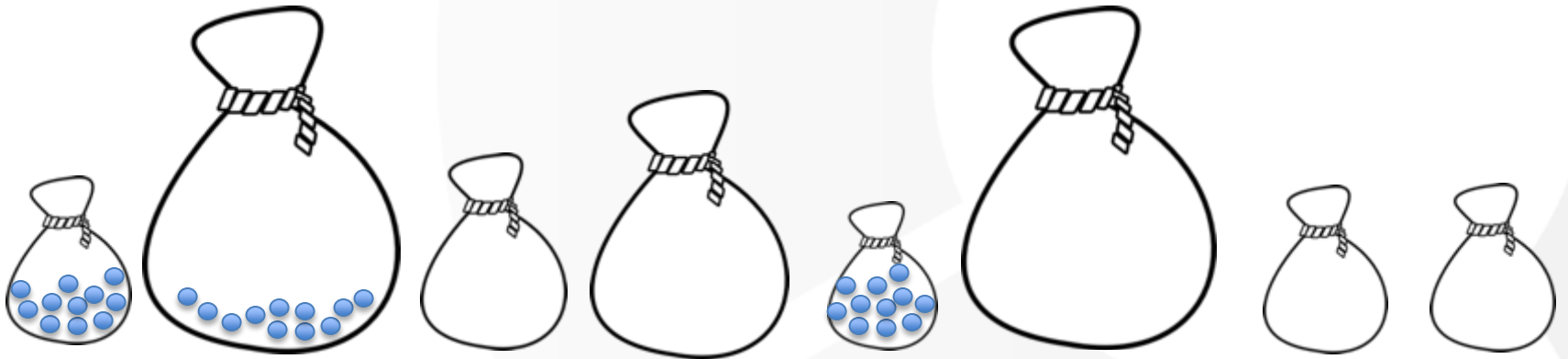
SPR analysis

Strategic bibliometric analysis



Profile UrFU

- Distribution of UrFU publications over all sciences (4000 areas, publication clusters)
- 634 areas contain at least 1 UrFU publication
- 120 areas with 10 publications or more (2000-2015)



Map of all sciences

Basic structure

Social Sci & Hum.

Maths & CompSci

Life & Earth

Biomedical & Health

Physical Sci & Engin.

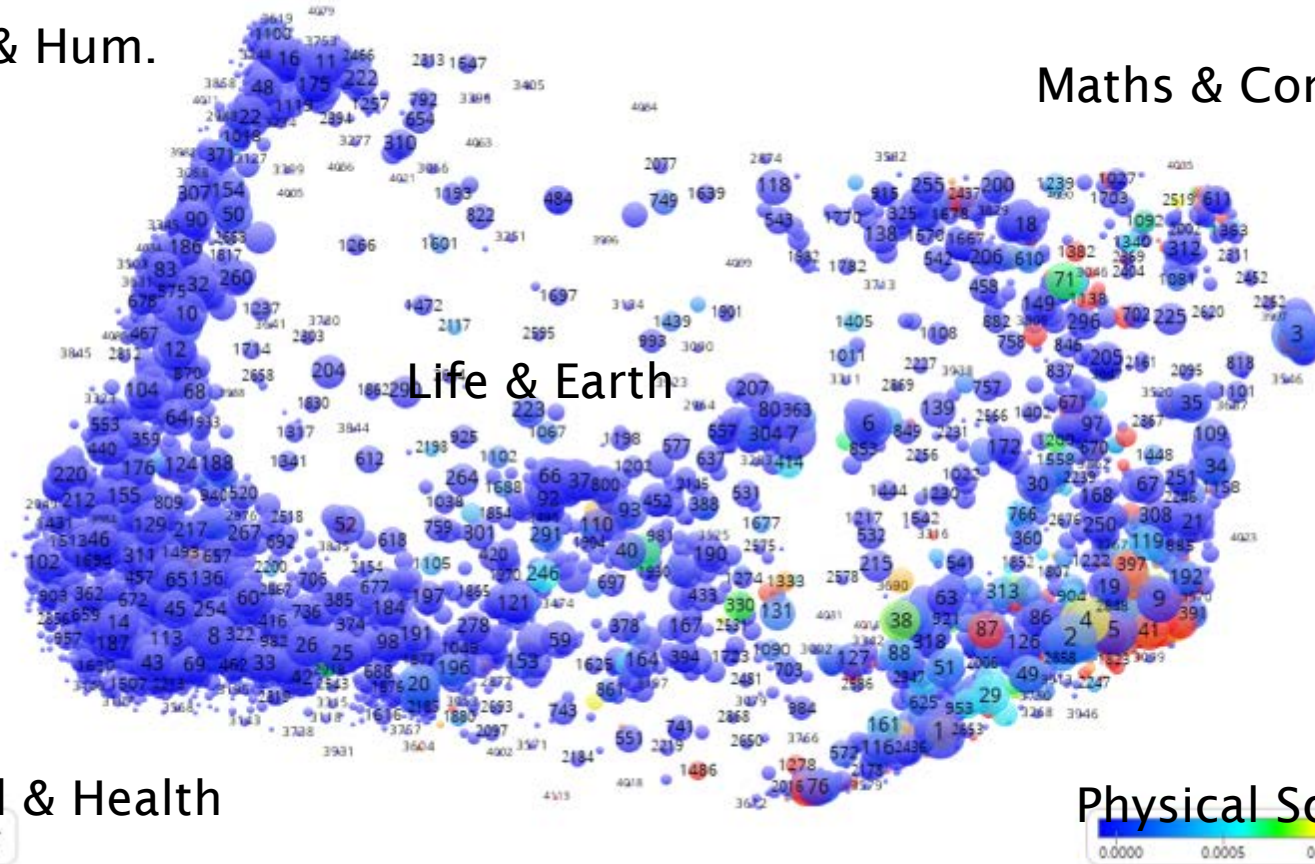


Map of all sciences

Size: world; Color: share UrFU publications

Social Sci & Hum.

Maths & CompSci



Map of all sciences

Size: UrFU; Color: share UrFU publications

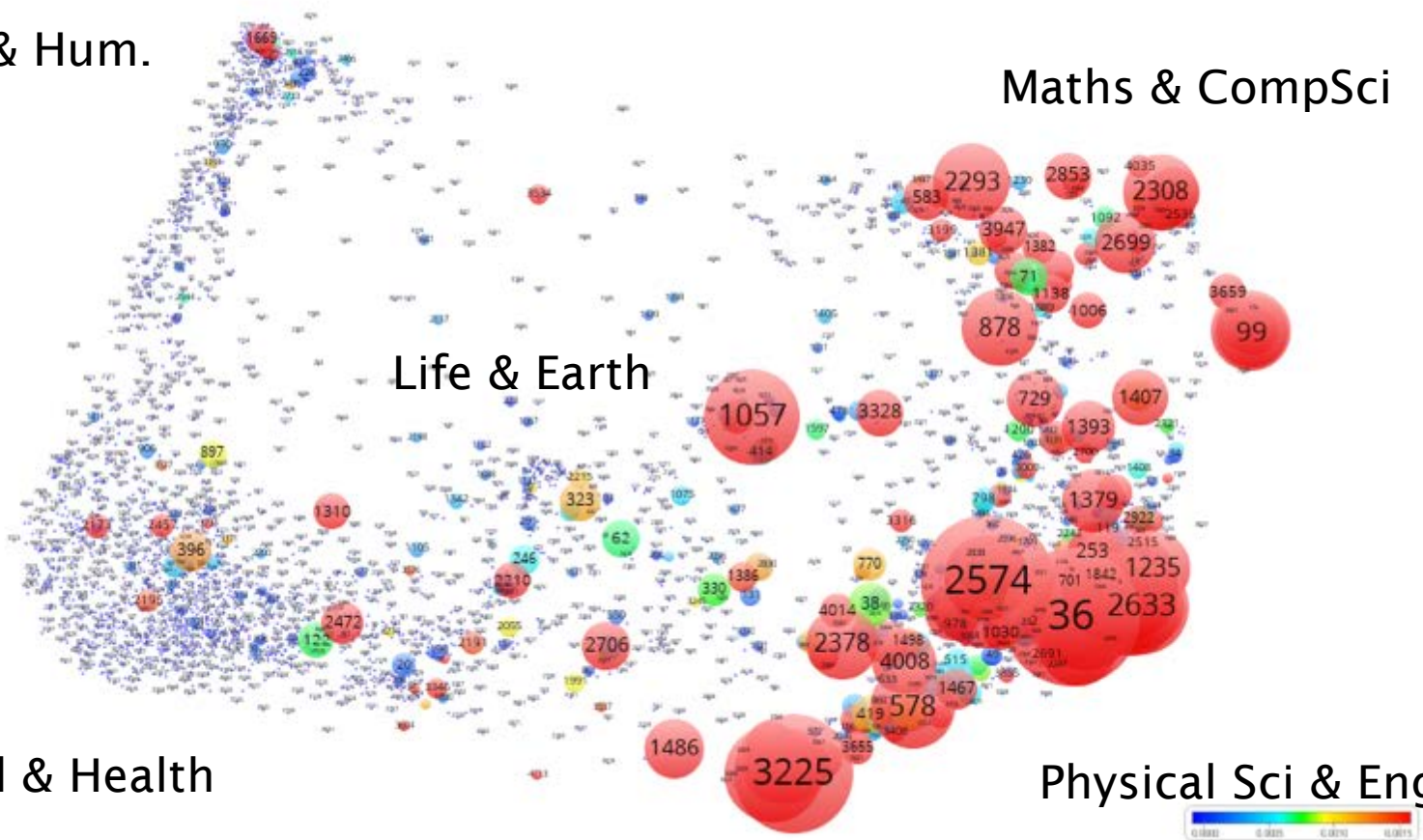
Social Sci & Hum.

Maths & CompSci

Life & Earth

Biomedical & Health

Physical Sci & Engin.



VDSviewer

Strength, Potential, Risk areas

- *Definitions*

Type	P	MNCS	MNJS
Strength	>10	Above UrFU average	Well above UrFU average
Potential	>10	Below UrFU average	Above world average
Risk	>10	Below UrFU	Below world average

Map of all sciences

Size: UrFU; Color: Strength areas UrFU

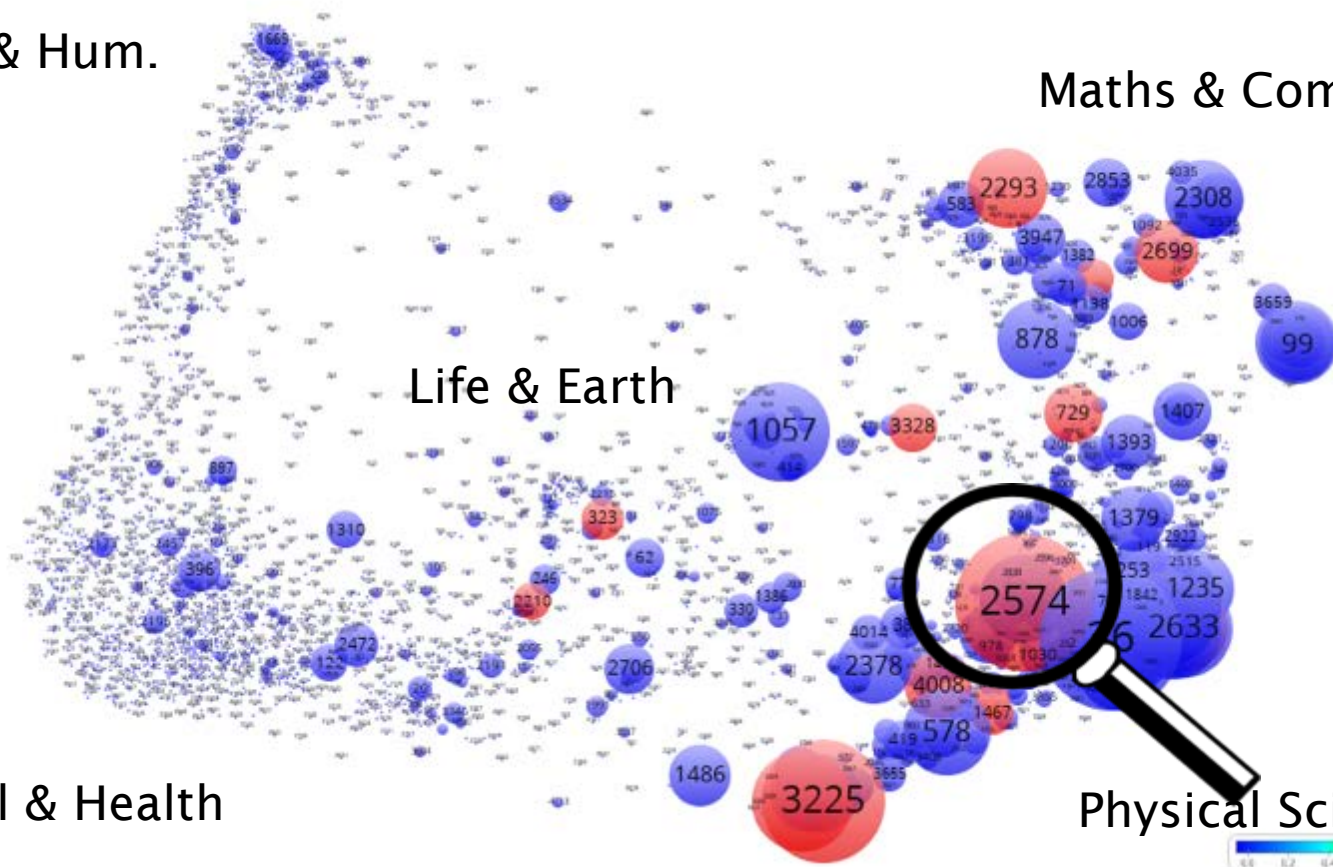
Social Sci & Hum.

Maths & CompSci

Life & Earth

Biomedical & Health

Physical Sci & Engin.



VDSviewer

Map of all sciences

Size: UrFU; Color: Opportunity areas UrFU

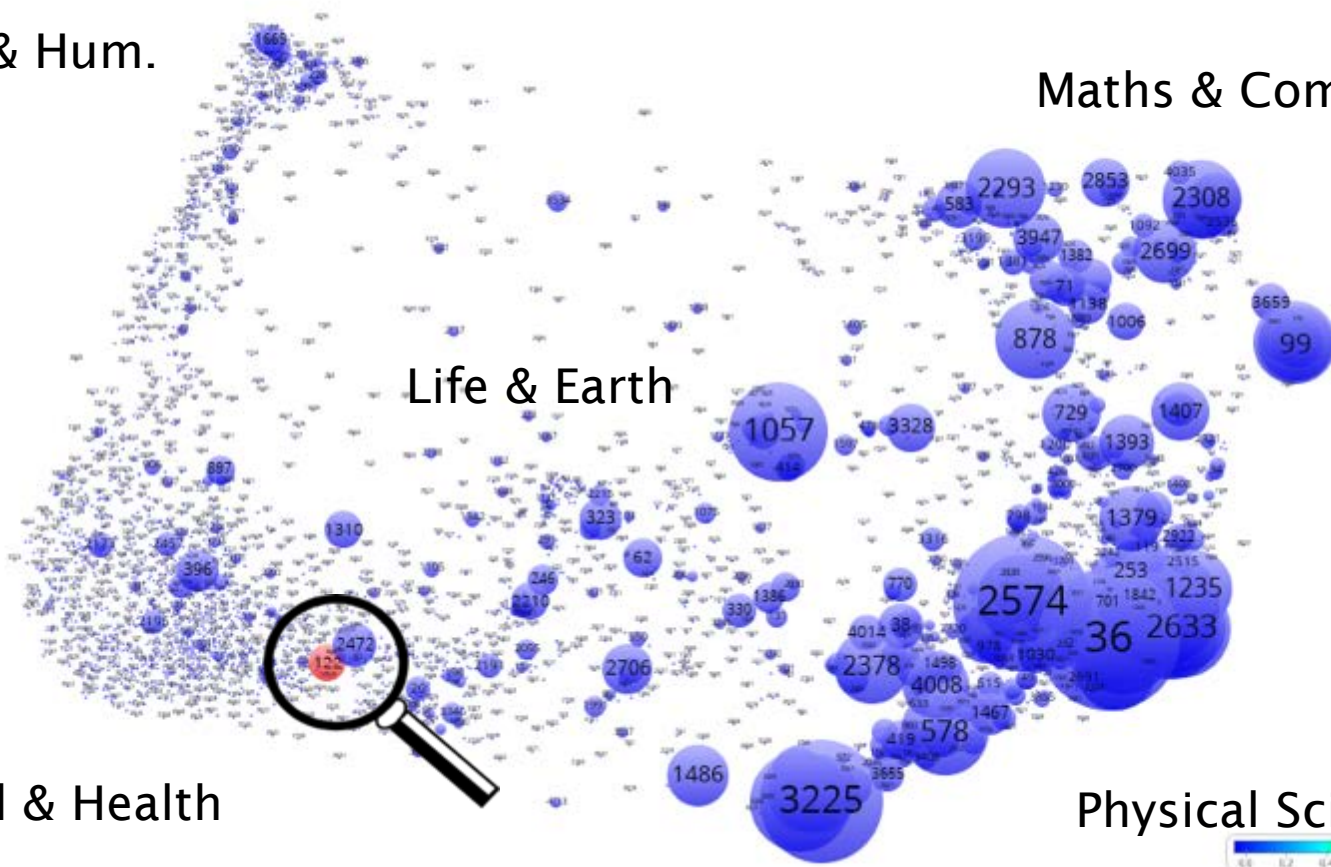
Social Sci & Hum.

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VDSviewer

Map of all sciences

Size: UrFU; Color: Risk areas UrFU

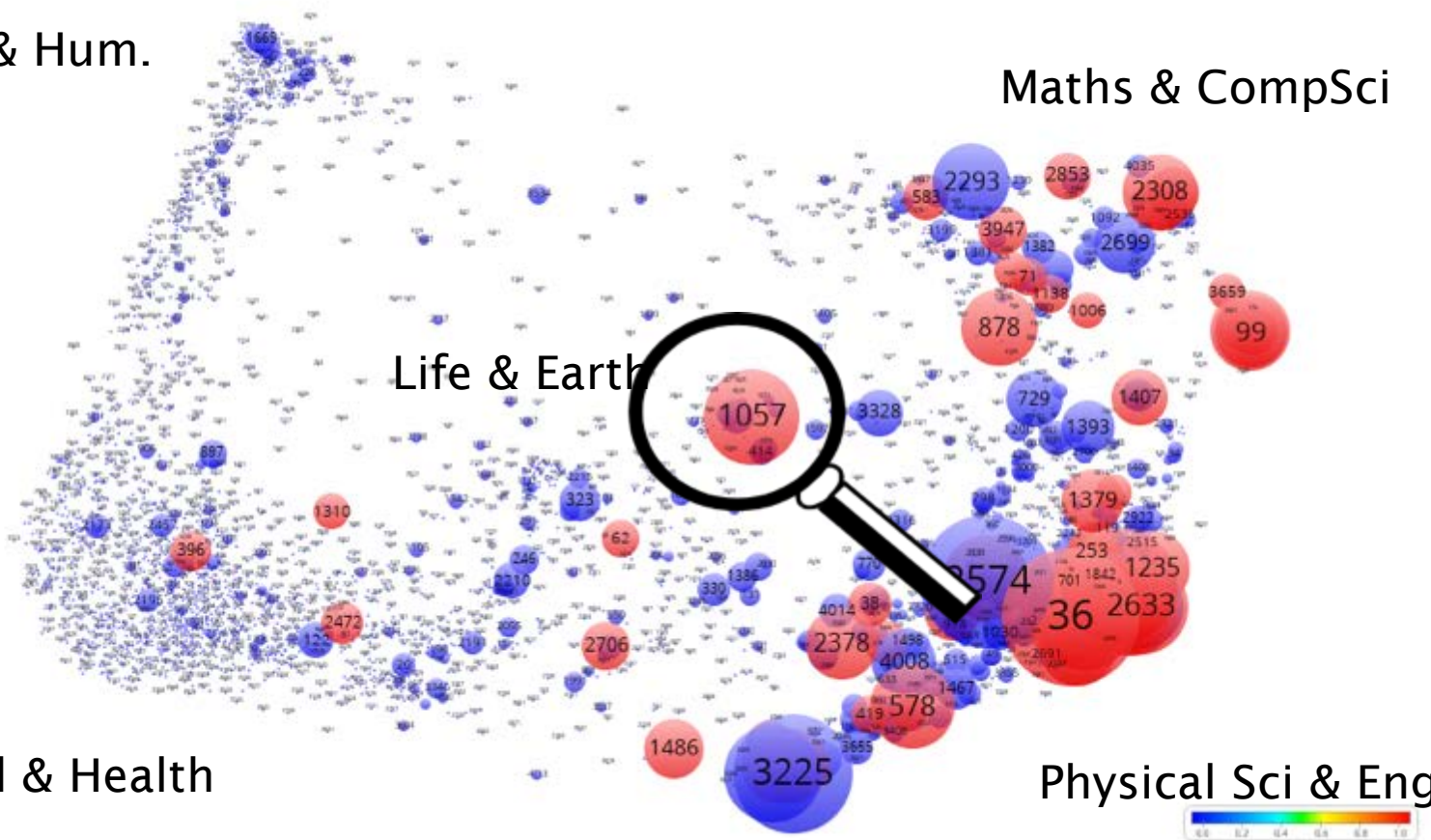
Social Sci & Hum.

Maths & CompSci

Life & Earth

Biomedical & Health

Physical Sci & Engin.



VDSviewer

Strength, Potential and Risk

S

id: 2574 Size: 2137 - Main fld: Physical sciences and engineering

- JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS; PHYSICAL REVIEW E; JOURNAL OF CHEMICAL PHYSICS; MAGNETOHYDRODYNAMICS; JOURNAL OF FERROFLUIDS; ferrofluid; magnetic fluid film; rosenzweig instability; small angle neutron; rheological property;

Growth (wrld): 0.11 PP(npl): 0.006 PP(C): 0.025

Actor: Ural Federal University - P: 128 - Strength: 1 Growth (actor): 0.15 (normalized: 1.36)

Performance: MNJS: 1.10- MNCS: 1.37 - PPTop10: 0.18 - PP Intl Collab: 0.41 - PP (UI): 0.01

P

id: 122 Size: 13932 - Main fld: Life and earth sciences

- VETERINARY PARASITOLOGY; INFECTION AND IMMUNITY; TICKS AND TICK-BORNE DISEASES; EMERGING INFECTIOUS DISEASES; JOURNAL OF BORRELIA BURGDORFERI; lyme disease; lyme borreliosis; anaplasma phagocytophilum; babesiosis;

Growth (wrld): 0.16 PP(npl): 0.016 PP(C): 0.045

Actor: Ural Federal University - P: 10 - Opp: 1 Growth (actor): 0.50 (normalized: 3.11)

Performance: MNJS: 1.34- MNCS: 0.62 - PPTop10: 0.00 - PP Intl Collab: 0.00 - PP (UI): 0.00

R

id: 1057 Size: 5980 - Main fld: Physical sciences and engineering

- RADIATION MEASUREMENTS; RADIATION PROTECTION DOSIMETRY; QUATERNARY INTERNATIONAL; QUATERNARY GEOCHRONOLOGY; QUATERNARY THERMOLUMINESCENCE; lif; tld; al2o3; quartz;

Growth (wrld): 0.16 PP(npl): 0.007 PP(C): 0.043

Actor: Ural Federal University - P: 66 - Threat: 1 Growth (actor): 0.23 (normalized: 1.39)

Performance: MNJS: 0.59- MNCS: 0.53 - PPTop10: 0.04 - PP Intl Collab: 0.03 - PP (UI): 0.00

Conclusions

- Ambition requires strategy;
- Mostly ranking information not sufficient to be used;
- Ranking as such mostly not very useful;
- More detailed information on one dimension can provide more valuable information;
- SPR study provides input to define strategy.